
Theory I, Sheet 8

- The solutions should be submitted in English.
- JUST FOR FUN exercises are not mandatory.
- Your solutions should be delivered to the lockbox in building 051 floor 00, or right before the start of the tutorial (June 25, 4:00 p.m.).
- You are allowed to discuss your solutions with each other. Nevertheless, you are required to write down the answers in your own words.

Exercise 8.1 - Approximate string matching

Given the text $T = POCOLOCO$ and the pattern $P = FOCO$ find the substrings in T , that are most similar to the pattern P . Show the following:

1. Dependency graph.
2. Substrings which are most similar to P .
3. Optimal traces.

Exercise 8.2 - Substitutions

For this exercise, we use infix notations for terms.

1. Let $t = \neg(x \wedge (\mathbf{T} \vee y)) \in T(\Sigma_{pred}, X)$. Compute $\sigma(t)$ and $\tau\sigma(t)$ where $\sigma = \{x \mapsto \mathbf{F}, y \mapsto \mathbf{T} \wedge x\}$ and $\tau = \{z \mapsto \mathbf{T}, x \mapsto \mathbf{T}\}$.
2. Let $t = \neg(\mathbf{T} \wedge (\mathbf{F} \vee y)) \in T(\Sigma_{pred}, X)$ and $s = \neg(x \wedge (\mathbf{F} \vee (x \wedge \mathbf{F}))) \in T(\Sigma_{pred}, X)$. Find a substitution σ such that $\sigma(t) = \sigma(s)$.
3. Is substitution composition commutative? If yes, give a proof. Otherwise give a counterexample.

Exercise 8.3 - Term induction

JUST FOR FUN. Given a finite signature Σ and a finite set of variables X . Show by using term induction, that for all terms $t \in T(\Sigma, X)$, the set $\mathcal{Pos}(t)$ is prefix closed. i.e. if $wv \in \mathcal{Pos}(t)$ then $w \in \mathcal{Pos}(t)$.